

Unconventional Monetary Policy and Bank Lending Relationships

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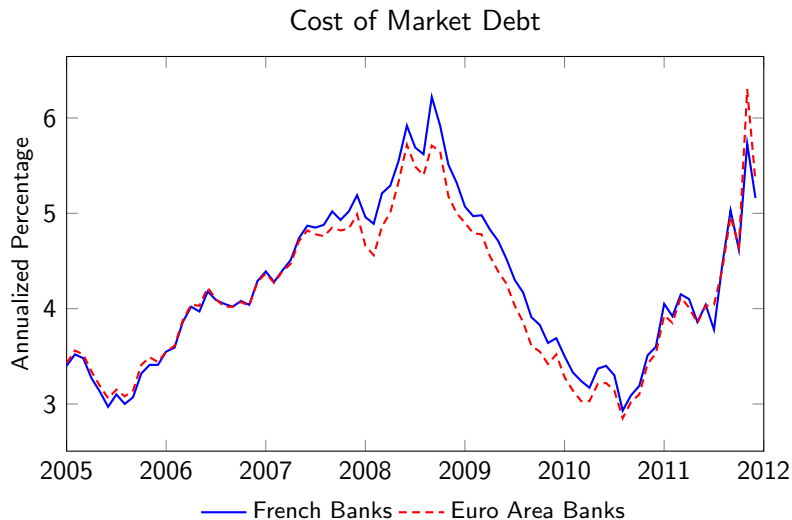
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Motivation



Source: Gilchrist and Mojon (2017)

Motivation

- ▶ Many policies attempt to reduce bank funding costs and increase incentives to lend (ECB vLTROs ; UK FLS) ECB Rates
- ▶ Potential reasons for inefficiency:
 - ▶ Hoarding liquidity (Allen et al. 2009; Caballero & Krishnamurthy 2008)
 - ▶ Crowding out (Diamond & Rajan, 2011; Abbassi et al. 2016; Chakraborty et al. 2016)
- ▶ No policy effects on lending to (non-large) firms
 - ▶ Iyer et al. 2014; Andrade et al. 2015; Acharya et al. 2015; Darmouni & Rodnyansky 2016.
- ▶ Small and young firms critical to economy, particularly sensitive to downturns / bank shocks
 - ▶ 2/3 of workforce in FR; 58% of total value added
 - ▶ Highly bank dependent, 80% are single-bank

Research questions

- ▶ How to support *private* lending to SMEs during aggregate contractions?
- ▶ How do banks adjust their lending portfolio in response to a positive supply shock ?
 - ▶ How do bank lending relationships affect shock transmission ?
 - ▶ Relaxing firm financial constraints or pushing bad loans ?
- ▶ Are *single-bank* firms especially credit constrained in crisis periods ?

Regulatory shock: Collateral Framework Extension

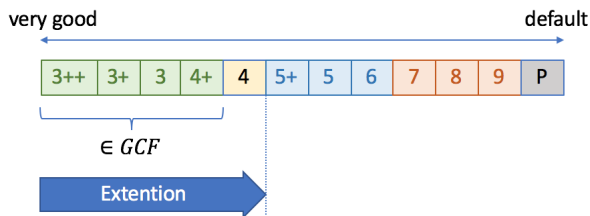


“[The ECB] will allow banks to use loans as collateral with the Eurosystem, thereby unfreezing a large portion of bank assets.(...) The goal of these measures is to ensure that firms—and especially small and medium-sized enterprises—will receive credit as effectively as possible under the current circumstances.”

Mario Draghi, 12/15/2011

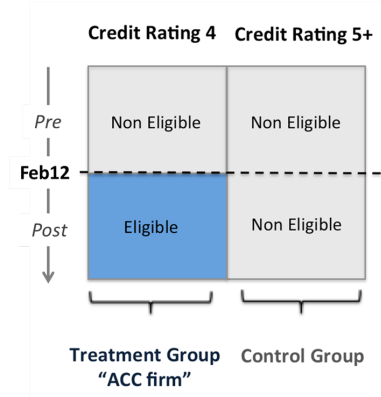
Eurosystem General Collateral Framework

- ▶ Eurosystem provides central bank liquidity only against *adequate* collateral
- ▶ Eligibility criteria defined in Single List
 - ▶ Marketable: sovereign bonds, covered bonds, ABS, etc.
 - ▶ Non-marketable assets: loans or CCs
- ▶ CCs eligibility based on minimum Credit Rating requirements
- ▶ BDF has its own rating system, acknowledged by the Eurosystem ($\approx 50\%$ of FR banks' collateral is made of CCs)



Additional Credit Claims / ACC

In Feb 2012, loans to firms rated 4 become eligible as collateral



Choice of control group

- ▶ Banks can now use lower quality loans as collateral at a time of massive liquidity injections (2nd vLTRO)
- ▶ Allows banks to borrow more (and cheaply) from Central Bank; Estimated bank marginal cost of funding: 400 bp → 100 bp
- ▶ **Shock operates at firm credit-rating level**, unlike extensive literature on shocks at the bank level

Data sources

- ▶ **Monthly credit data at firm×bank level, aggregated at firm level**
 - ▶ Outstanding amounts of credit, from National Credit Register
 - ▶ Provided bank has a risk exposure to firm > 25,000 euros
- ▶ **Firm-level accounting data** from annual tax returns,
 - ▶ Collected for all firms with sales > 0.75 million euros
- ▶ **Firm-level rating information** provided by BdF,
- ▶ **Individual payment default data** on trade bills
 - ▶ All non-payment on commercial paper that is mediated by French banks

Sample composition

- ▶ About 8,200 French SMEs over 2011–2012
- ▶ Independent firms (one legal unit), SA and SARL
- ▶ Drop financials, utilities, health, teaching and farming
- ▶ Assignment treat/control based on CR in Dec. 2011
4/ACC (treated/better) and 5+ (control/worse)

	Single-bank			Multibank		
	ACC	5+ firms	All	ACC	5+ firms	All
Total Assets	1,822	1,975	1,879	2,489	2,424	2,465
Age	19.7	14.1	17.6	22.4	19.8	21.5
Bank Debt K€	288	722	450	447	536	480
Leverage	0.18	0.34	0.24	0.19	0.25	0.21
# Banks	1	1	1	2.6	2.7	2.6
Payment Default	0.045	0.046	0.045	0.052	0.058	0.054
Observations	22,909	13,641	36,550	39,366	22,879	62,245
Unique firms	1,911	1,138	3,049	3,284	1,908	5,192

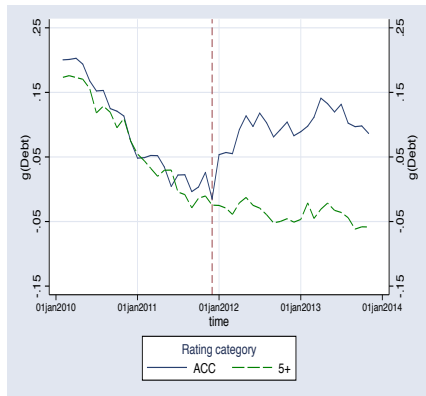
Empirical Design: Difference in Differences

$$g_{it} = \beta [ACC \times post]_{it} \\ + \text{firm FE} + [\text{bank x}] \text{ month FE} + \text{industry x quarter FE} \\ + \gamma' Controls_{i,y-1} + \epsilon_{it}$$

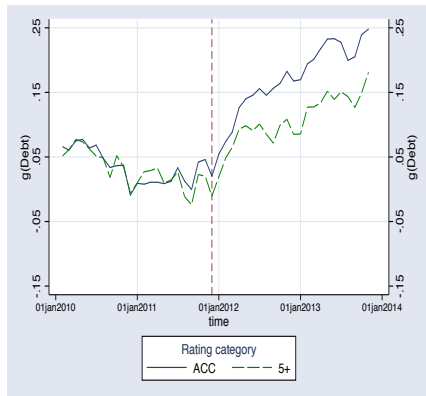
with *cumulative debt growth* $g_{it} = (D_{it} - D_i^*)/D_i^*$.

- ▶ Main omitted variable concerns :
 - ▶ **Firm loan demand**: use **firm FE** to control for unobserved fixed heterogeneity in fundamentals (proxy for credit demand)
 - ▶ **Bank time-varying capital & liquidity shocks** :
use **bank x month FE**
 - ▶ **Industry-level shocks**: use **industry x quarter FE**
- ▶ Monthly credit registry data allows Powerful test of *parallel trends* and *timing of effects*

ACC mainly affects single-bank firms



Single-bank firms



Multibank firms

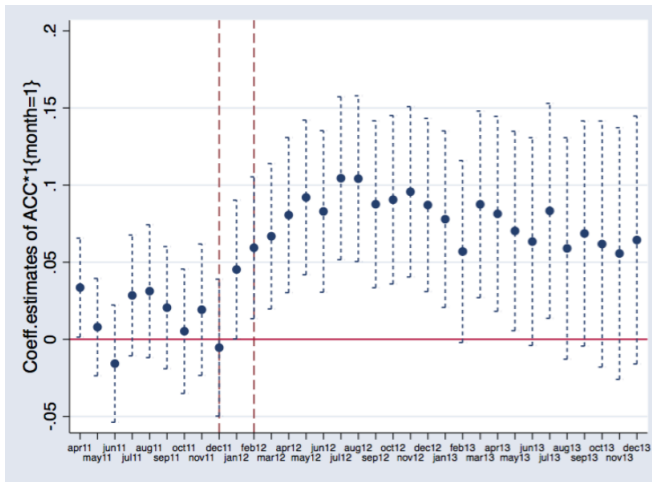
Effect of the ACC policy on credit growth

Treated 1-bank firms: 8.7 percentage point higher debt

	Single-bank				All firms	
	(1)	(2)	(3)	(4)	(5)	(6)
ACC×post	0.102*** (0.017)	0.094*** (0.017)	0.089*** (0.018)	0.087*** (0.019)	0.035** (0.015)	0.120*** (0.037)
ACC×post×SingleBank					0.053** (0.024)	
post×SingleBank					-0.095*** (0.018)	
ACC×post×N Bank						-0.062* (0.033)
post×N Bank						0.097*** (0.024)
Time FE	yes					
Firm FE	yes	yes	yes	yes	yes	yes
Bank-Time FE		yes	yes	yes	yes	yes
Industry-Qtr FE			yes	yes	yes	yes
Covariates				yes	yes	yes
N of clusters (firms)	2,973	2,968	2,968	2,671	7,445	7,445
Observations	63,131	63,041	63,041	55,997	157,695	157,695
R ²	0.41	0.42	0.42	0.43	0.41	0.41

Monthly dynamics of the ACC effect

Single-bank firms



Which single-bank firms receive extra credit?

Firms with best observables

- ▶ Low leverage, more tangible assets, older, and net providers of trade credit 1
- ▶ High-growth firms 2

Effect transmitted through lending relationships

- ▶ Longer lending relationship \cap wider scope \rightarrow larger effect 3
- ▶ BUT Soft info does not substitute for hard info 4

Banking relationships over the cycle provide continuation lending in crisis, but for high quality firms (Bolton et al., 2016)

Is this Good Lending?

Reduced contagion: default on debt to suppliers falls $\approx 1.5\%$ of payables

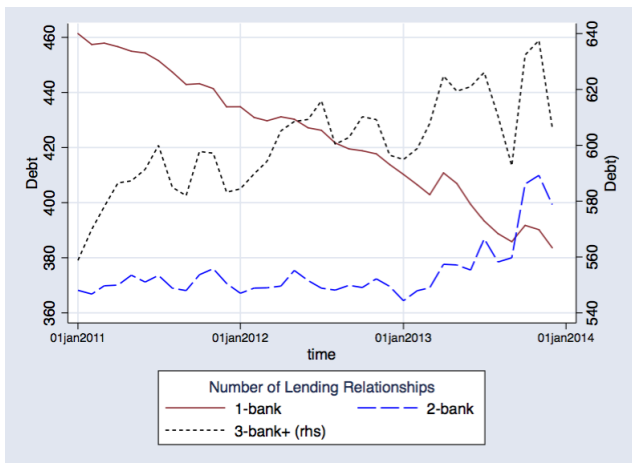
	2011m3–2013m2		2011m3–2013m12	
	(1)	(2)	(3)	(4)
ACC \times post	-0.013** (0.006)		-0.015** (0.006)	
ACC \times pre		0.001 (0.005)		0.001 (0.005)
ACC $\times 1_{t>2012m2 \ \& \ t\leq 2012m8}$		-0.004 (0.007)		-0.004 (0.007)
ACC $\times 1_{t>2012m8 \ \& \ t\leq 2013m2}$		-0.021* (0.011)		-0.021* (0.011)
ACC $\times 1_{t>2013m2}$				-0.018** (0.008)
Covariates	yes	yes	yes	yes
Bank FE	yes	yes	yes	yes
Industry-time FE	yes	yes	yes	yes
Firm FE	yes	yes	yes	yes
Num. clustering firms	2,743	2,743	2,743	2,743
Observations	65,127	65,127	83,838	83,838
R ²	0.11	0.11	0.12	0.12

Robustness & Extensions

- ▶ Downgrade:
lower probability of 'severe' downgrade (by 2 notches) 1
- ▶ Placebo:
no effect on non-pledgeable types of debt 2
- ▶ Robust to:
 - ▶ scaling of debt: 6.5 to 8.8 pp effect using different measures
 - ▶ clustering at bank-quarter level
 - ▶ including a time trend
- ▶ Crowding out of controls (5+-rated firms):
small, not statistically significant effect 3

Single-bank seem more financially constrained ex-ante

- Consistent with benefits of multiple lending relationships to insure against bank liquidity shocks (Detragiache et al., 2000)



Outstanding Amounts in M€

Conclusion

Cleanly identified micro-evidence on causal link between :

- ▶ Reduced cost of bank funding → SME lending increase
 - ▶ Central OECD policy objective
 - ▶ No evidence of zombie lending
 - ▶ Reducing default contagion

Focus attention on single-bank firms in crises—they appear especially credit constrained

- ▶ Relationship banking provides insurance only for strong firms
- ▶ Policies changing cost of liabilities may be more effective if change is tied to the assets they are expected to finance

Thanks for your attention!

APPENDIX

Main Takeaways

We find a causal effect of reduced cost of funding loans on :

- ▶ **Extra lending:** effect is driven by 1-bank firms (+8.7%)
- ▶ **Lower payment default rate** to suppliers, potentially reducing contagion effects ; Lower probability of rating downgrades.

We provide empirical evidence consistent with:

- ▶ No evergreening: additional credit flows to 1-bank firms with strong balance sheets and lending relationships
- ▶ 1-bank firms (vs. multibank) being more credit constrained ex-ante

Note: 1-bank firms are naturally "relationship borrowers" anyway

Related Literature

- ▶ **Liquidity shocks are passed on to banks ...**

Peek & Rosengren 2000; Gan 2007; Paravisini 2008; Khwaja & Mian 2008; Schnabl 2012; Iyer et al. 2014; Jimenez et al. 2012

- ▶ **... and to more vulnerable firms**

Khwaja & Mian 2008; Iyer et al. 2014

- ▶ *We have shock varying at the firm level*
- ▶ *We can look at 1-bank firms using within bank-month estimator*

- ▶ **Mixed evidence on value of relationship lending**

Increased credit availability, reduced cost, lending continuation over the cycle

(Petersen & Rajan 1994; Sette & Gobbi 2015; Bolton et al. 2016)

BUT hold up and rent extraction

(Rajan 1992; Santos & Winton 2008; Ioannidou & Ongena 2010)

- ▶ *We can look at 1-bank and multiple bank firms*

Sample characteristics

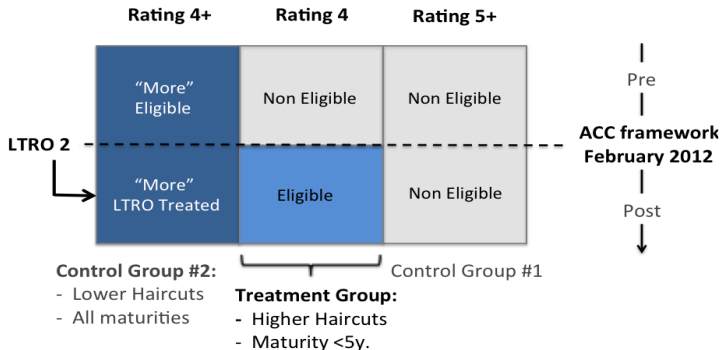
- ▶ French SMEs: firms with 10 - 250 workers
 - ▶ Also includes firms with < 10 workers if sales are $> 2M$ euros and total assets $> 2M$ euros
 - ▶ Independent firms (one legal unit), SA and SARL
 - ▶ Drop financials, utilities, health, teaching and farming (standard)
- ▶ Firms observed throughout 2011 and 2012
- ▶ Credit ratings of: 4 (treated, better) and 5+ (control, worse)
- ▶ Number of unique firms: 8,200

Empirical Design

Choice of Control Group

5+ is the right control group

- ▶ ACC is concurrent with LTRO 2
- ▶ 4+ are also treated and with higher treatment intensity



Descriptive Statistics I

	Single-bank (# 36,550)		Multibank (# 62,245)		<i>p</i> -val.
	Mean	Med.	Mean	Med.	
Total Assets	1,879	1,141	2,465	1,416	0.000
Age	17.6	14.0	21.4	19.0	0.000
Bank Debt K€	450	160	480	235	0.093
Leverage	0.24	0.17	0.21	0.18	0.000
N.Banks	1.0	1.0	2.6	2.0	0.000
Payment Default	0.045	0.00	0.054	0.00	0.001

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Descriptive Statistics II

Single-bank firms

	ACC firms (# 22,909)		5+ firms (# 13,641)		p-val.
	Mean	Med.	Mean	Med.	
Total Assets	1,822	1,034	1,975	1,417	0.472
Age	19.7	17.0	14.1	9.0	0.000
Bank Debt K€	288	118	722	295	0.000
Leverage	0.18	0.13	0.34	0.29	0.000
Payment Default	0.045	0.00	0.046	0.00	0.820

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Funding conditions for French banks

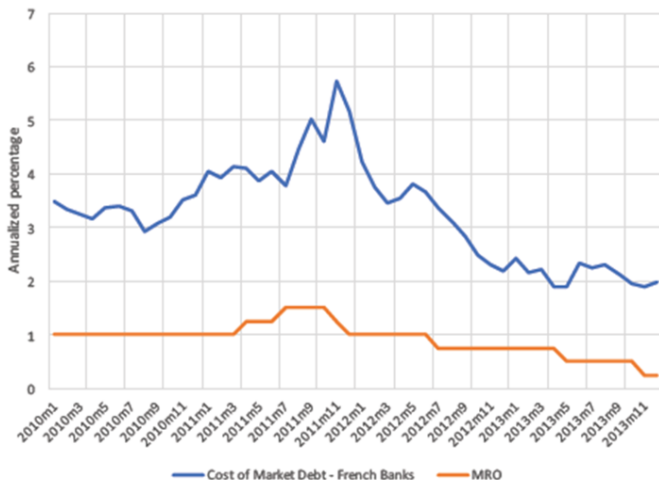


Figure: Market vs. ECB funding costs (Gilchrist & Mojon 2017)

$g(\text{Debt})$ by rating category: 5+, ACC, 4+ and 3



Figure: Single-bank firms

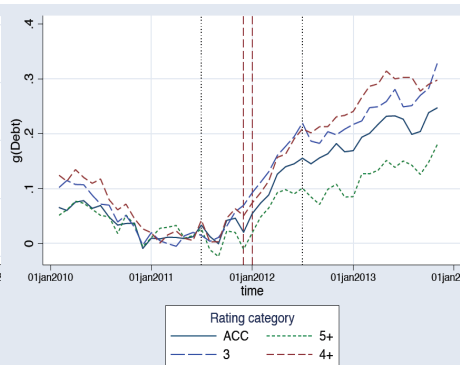
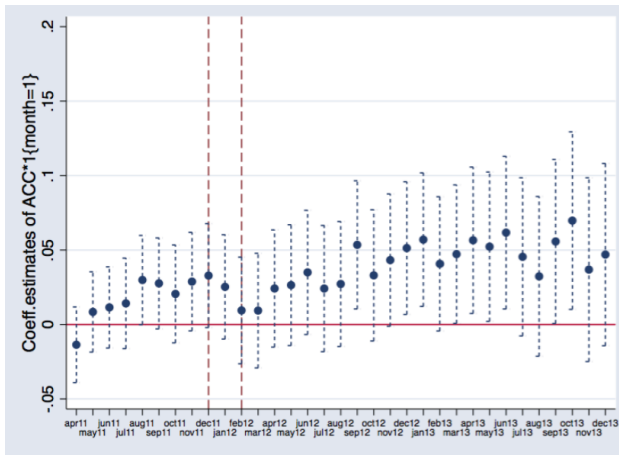


Figure: Multibank firms

Monthly dynamic of the ACC effect

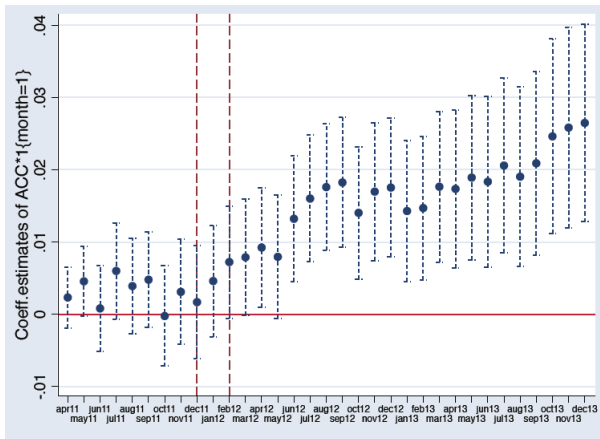
Multibank firms



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Monthly dynamic of the ACC effect on Leverage

Single-bank firms



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ACC effect conditional on Hard Information

"Good" lending : credit does not flow to firms with weak balance-sheets

	High Leverage	Low Tangibles	Trade Credit User	Young	Small
	(1)	(2)	(3)	(4)	(5)
ACC×post×D	-0.084** (0.041)	-0.090*** (0.031)	-0.067* (0.040)	-0.093** (0.039)	-0.043 (0.034)
ACC×post	0.097** (0.039)	0.099*** (0.023)	0.122*** (0.033)	0.091*** (0.022)	0.100*** (0.023)
post×D	-0.145*** (0.034)	-0.026 (0.025)	-0.021 (0.032)	-0.036 (0.023)	-0.007 (0.023)
Covariates	yes	yes	yes	yes	yes
Bank-Time FE	yes	yes	yes	yes	yes
Industry-Qtr FE	yes	yes	yes	yes	yes
Firm FE	yes	yes	yes	yes	yes
N of clusters (firms)	2671	2968	2783	2671	2968
Observations	55,997	63,041	59,142	55,997	63,041
R ²	0.44	0.42	0.42	0.43	0.42

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ACC effect on "Gazelles" and Young firms

"Good" lending : positive credit shock for high-growth firms

	Conditions under which $G = 1$		
	(1) Gazelles	(2) High Sales	(3) Young
ACC \times post \times G	0.118 (0.236)	0.116* (0.069)	0.098 (0.243)
ACC \times post	0.081*** (0.020)	0.081*** (0.022)	0.089*** (0.021)
post \times G	0.068 (0.218)	-0.079* (0.048)	0.070 (0.224)
Covariates	yes	yes	yes
Bank-Time FE	yes	yes	yes
Industry-Qtr FE	yes	yes	yes
Firm FE	yes	yes	yes
N of clusters (firms)	2295	2294	2294
Observations	52,889	48,477	48,477
R ²	0.43	0.42	0.42

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ACC supply shock & Relationship Lending

Stronger increase in debt for longer and information-intensive relationships

	Conditions under which $D = 1$		
	(1) Long RL	(2) Large Scope	(3) Both
$ACC \times post \times D$	0.070** (0.035)	0.056 (0.052)	0.155*** (0.060)
$ACC \times post$	0.036 (0.024)	0.069*** (0.019)	0.060*** (0.019)
$post \times D$	-0.000 (0.024)	0.005 (0.035)	-0.044 (0.034)
Covariates	yes	yes	yes
Bank-Time FE	yes	yes	yes
Industry-Qtr FE	yes	yes	yes
Firm FE	yes	yes	yes
N of clusters (firms)	2,672	2,672	2,672
Observations	61,153	61,153	61,153
R ²	0.43	0.43	0.43

ACC effect conditional on Hard Information

[LR \geq 6]: Soft information does not offset the dominant role of hard information

	Conditions under which $D = 1$			
	High Leverage (1)	Low Tangibles (2)	Trade Credit User (3)	Small (4)
$ACC \times post \times D$	-0.144*** (0.052)	-0.116** (0.047)	-0.099* (0.054)	-0.127** (0.055)
$ACC \times post$	0.150*** (0.046)	0.125*** (0.030)	0.169*** (0.043)	0.143*** (0.031)
$post \times D$	-0.120*** (0.040)	-0.045 (0.0409)	-0.012 (0.043)	0.025 (0.042)
Covariates	yes	yes	yes	yes
Bank-Time FE	yes	yes	yes	yes
Industry-Qtr FE	yes	yes	yes	yes
Firm FE	yes	yes	yes	yes
N of clusters (firms)	1515	1577	1519	1577
Observations	31,711	33,174	32,009	33,174
R ²	0.43	0.42	0.43	0.42

Good Lending?

ACC effect on defaults to payments to suppliers

- ▶ Payment default
 - ▶ Failure to pay a trade bill to a given supplier, in full and/or on time
 - ▶ For insolvency, liquidity or disputes motives
 - ▶ Average monthly payment default rate $\approx 4.5\%$
- ▶ Descriptive Statistics on Payment Default in 2011(Single-bank)

<i>Default in % of payables</i>	Mean	Sd	p50	N	pval (clust)
Rating 5+ firms	0.017	0.222	0.00	13,641	
ACC firms	0.010	0.145	0.00	22,909	0.056

Good Lending?

ACC effect on Payment Defaults on Trade Bills



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Robustness Tests

Effect of the ACC policy on non-pledgeable types of debt

	(1) Undrawn	(2) Undrawn/TA	(3) Leasing	(4) Leasing/TA
ACC \times post	-0.086 (0.109)	-0.002 (0.003)	-0.015 (0.088)	-0.004 (0.005)
Covariates	yes	yes	yes	yes
Bank-Time FE	yes	yes	yes	yes
Industry-Qtr FE	yes	yes	yes	yes
Firm FE	yes	yes	yes	yes
N of clusters (firms)	1069	1116	607	614
Observations	15,935	24,294	11,301	13,419
R ²	0.54	0.73	0.80	0.88

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Crowding Out

Effect of the ACC policy on 5+-rated (control) firms

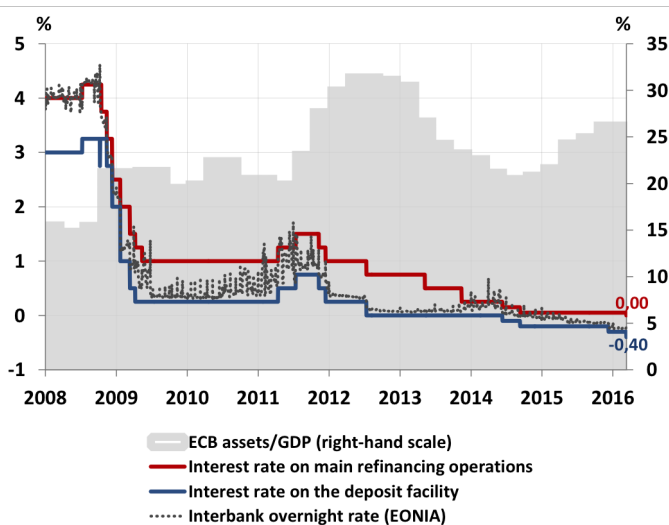
	(1)	(2)	(3)	(4)
[5+]×post	-0.023 (0.023)	-0.016 (0.023)	-0.013 (0.023)	-0.018 (0.027)
Time FE	yes			
Firm FE	yes	yes	yes	yes
Bank-Time FE		yes	yes	yes
Industry-Qtr FE			yes	yes
Covariates				yes
N of clusters (firms)	1,562	1,561	1,561	1,302
Observations	33,594	33,572	33,571	27,418
R ²	0.41	0.42	0.42	0.43

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Lower probability of downgrade for treated firms

	<i>P</i> (2-notch Downgrade)		
	(1)	(2)	(3)
ACC×postJune	-0.003** (0.001)		
ACC×2012q2		0.002 (0.002)	
ACC×2012q3		0.000 (0.002)	-0.001 (0.002)
ACC×2012q4		-0.003 (0.002)	-0.004** (0.002)
ACC×2013q1		-0.003 (0.002)	-0.004** (0.002)
Covariates	yes	yes	yes
Bank-Time FE	yes	yes	yes
Industry-Qtr FE	yes	yes	yes
Firm FE	yes	yes	yes
N of clusters (firms)	2,743	2,743	2,743
Observations	38,353	38,353	38,353
R ²	0.09	0.09	0.09

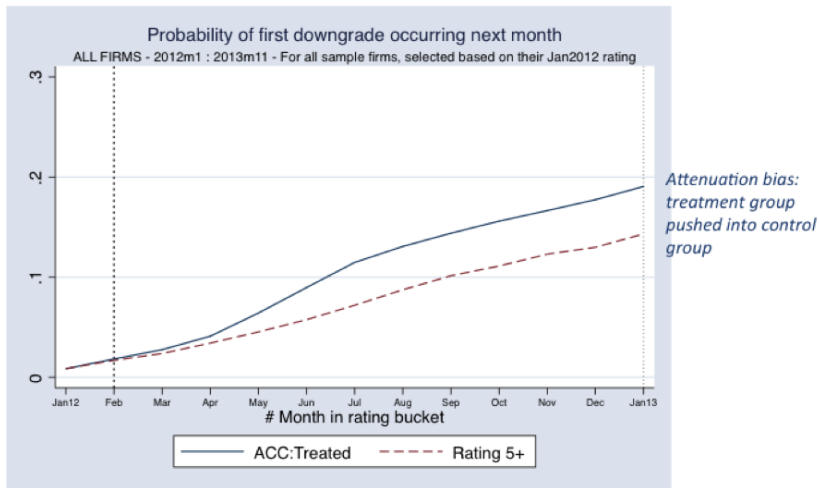
ECB Main Rates



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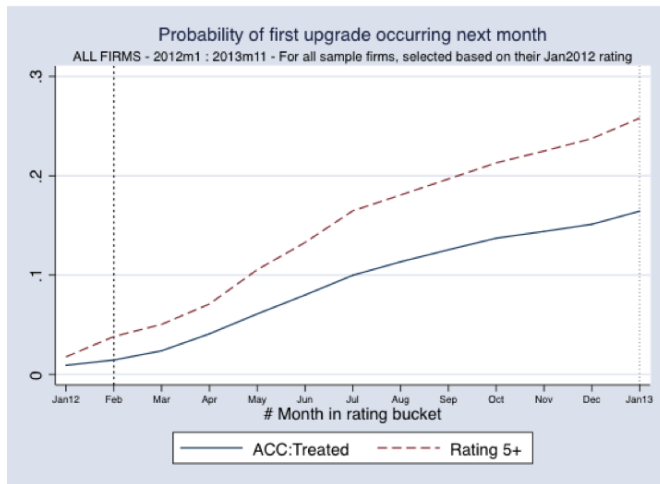
Rating changes over time [All firms]

Probability first downgrade occurs next month



Rating changes over time [All firms]

Probability first upgrade occurs next month



*Attenuation bias:
control group
pushed into
treatment group*